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51. Statistical Note on the Worm Parasites collected from the Animals dying in the Zoological Gardens, from December 1910 till April 1912. By WILLIAM NICOLL, M.A., D.Sc., M.D., F.Z.S., Lister Institute of Preventive Medicine, London.

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At the scientific meeting of the Society held on May 21st last, I referred to the excellent work which is being done by the Prosectorial department in acquiring information concerning the parasites which infect the animals living in the Gardens. This is particularly noteworthy in regard to the worm parasites, about which many valuable facts have been obtained. Following my remarks at the meeting, Dr. Beddard suggested that I might be able to supply some general information regarding the animals which had been sent to me for examination, and acting on this suggestion I venture to offer the following communication.

The scheme, which owes its initiation to the Secretary of the

Society, was put into action in November 1910, and the practical working has been evolved as follows: A general examination of the viscera of all the animals killed or dying in the Gardens is made by the Pathologist, after which certain selected examples are forwarded to me for further examination. The desirability of this latter procedure is shown by the fact that a very large proportion of Entozoa are too small to be detected in the course of an ordinary routine examination; and although the detection of such forms does not involve any very special skill, yet it is a tedious process and one which necessitates some experience. In justification of this extra trouble it may be remarked that the comparatively few animals which have been submitted to this additional examination have yielded almost as large a number of parasitic worms as all the other animals put together. This fact, I venture to believe, is a plea for a still more extended and exhaustive system of examination, dealing with all the animals which die in the Gardens. This, naturally, would involve some additional expenditure, which the Society is probably not at present in a position to incur, but it would certainly yield a very rich return.

In addition to supplying information with regard to the diseases and habits of the animals living in the Gardens, as was the original intention of the scheme, it also provides opportunities of studying the parasitic fauna of the various countries from which the animals come. This is a very important consideration, for it is an unfortunate fact that in most of the large faunistic expeditions which have hitherto been undertaken practically no attempt has been made to deal with the internal parasites. As important exceptions to this may be mentioned the German Expedition to Spitzbergen in 1898, and the Swedish Expedition to Egypt and the White Nile in 1901. By both of these expeditions a large number of parasitic forms has been collected, and the results have been published in a series of very valuable monographs. Dr. Leiper has, at these meetings, on more than one occasion called attention to this regrettable neglect of the parasitic fauna, and has urged on collectors the great service they would render by making even a cursory attempt to collect parasitic worms.

During the past seventeen months a total of 198 animals have been submitted to me for examination, the great majority of which have been birds and reptiles. Of these, 87 were found to be infected with worm parasites of one kind or another, *i.e.*, about 44 per cent. In most cases the infection was single, only one species of parasite occurring; but in an Indian Cobra as many as six different species were found. As is generally the case, Nematode infections were much more numerous than any others, there being 60 cases. Trematodes were found in 28 cases, and Cestodes in 15. The Trematodes belong to about 20 distinct species, a large proportion of which are new, and several of which are new generic types.

From the reports of Dr. Beddard and Dr. Leiper I gather that during the same period 41 additional cases of infection with tapeworms, and 53 of infection with Nematodes have been observed. To these must be added a very considerable number of infections with larval *Filaria* observed by Mr. Plimmer. These figures, excluding the larval *Filaria*, give a total of about 180, of which the infection with Trematodes, Cestodes, and Nematodes is respectively 28, 56, and 113. This appears to show that Trematode parasites are much rarer than other forms, but that is certainly not the case. It must be remembered that only a comparatively small number of the animals passing through the Prosectorium were adequately searched for Trematodes. The extent to which Trematodes and the smaller intestinal Nematodes escape notice except when thoroughly searched for may be gathered from the following table.

	Trematodes.	Cestodes.	Nematodes.
Total number of cases of infection	28	56	113
Number of cases found only on further examination .....	20	15	60
Percentage .....	71	26	53

It may be added that the bulk of the Cestoda which were not noted on first examination were small immature forms or fragments of no value. It may therefore be safely affirmed that only a negligible fraction of the mature tapeworms actually escape detection in the Prosectorium. The matter, however, is different with Trematodes; and in view of the fact that only about one-tenth of the total number of animals dying in the Gardens have been submitted to a thorough examination, it must appear that the number of Trematodes actually occurring is considerably greater. Even allowing that they only occur in 5 per cent. of cases, which is taking an extremely low estimate, we ought to have had instead of 28 records a total of well over 100. In the same way the number of small intestinal Nematodes ought to be much increased.

These remarks, however, are not intended as a criticism of the efforts of the prosectorial staff. Parasitic worms are, after all, only a very small part of the work of this department of the Society, and as I have mentioned in the beginning of this communication, considerable praise is due for the results actually obtained. My chief intention is to show that parasitic worms are undoubtedly an important concern and that their importance justifies the attention which is being paid to them. Their claim to notice had until recently been somewhat neglected by the Society, and it seems necessary that someone should offer a plea for their vindication. There can be no doubt that the attention which the Society, thanks to the efforts of Dr. Chalmers Mitchell, is devoting to these forms will do much to benefit Zoology as a whole.